

Access to Clean Water

"The children who have no clean water to drink, the women who fear for their safety, the young people who have no chance to receive a decent education have a right to better, and we have a responsibility to do better. All people have the right to safe drinking water, sanitation, shelter and basic services."

Ban Ki-moon, UN Secretary General

OVERVIEW

Although land surrounds us on almost all sides, 97.5% of the Earth is comprised of water, specifically saltwater. Of the total volume of water that the earth holds, only 2.5% is freshwater, or water that can be consumed by humans. Of that 2.5%, less than 1% of freshwater can be accessed by humans for drinking use. It is estimated that 1.1 billion people around the world do not have regular access to clean, safe, drinking water.



Water and access to clean water are imperative for human survival. Accordingly, in 2010 the UN recognized water and sanitation as a human right. Humans are made up of 70% water, which means that besides oxygen, water is the most important substance for the human body. The United Nations suggests that each person requires 20-50 liters of safe, freshwater daily to cover the individual's most basic needs of drinking, cooking, and cleaning. Unfortunately, millions of people around the world—mostly people in poor, rural areas—are forced to use unclean water or to go without water at all. Because these areas tend to lack adequate methods of waste disposal, much of the waste ends up back in the sources of water. Use and consumption of unclean water has extremely dangerous consequences. Dirty water is the primary cause of a number of diseases; the most ravaging waterborne disease is diarrhea, which is responsible for 1-2 million deaths annually, 90% of which are children under the age of five. About 3.5 million people die each year from water related diseases, more even than from any war or armed conflict.

HISTORY OF THE ISSUE

Water and water-related issues have been an important topic throughout human history. Many ancient civilizations—such as the Romans and the Egyptians—flourished because of their proximity to water sources. However, the connection between human health and clean water is a relatively recent



discovery. Water becomes contaminated when external agents, such as chemicals, pesticides, and human waste, infiltrate it. These agents then dissolve in the water and make it unsafe to drink. However, as earlier mentioned, the connection between contaminants and unclean water is fairly new. For centuries, human communities around the world unknowingly contaminated their water. For example, many societies, ranging from the Romans to Victorian England, would send their sewage waste straight into their water sources. As a result, waterborne diseases such as cholera and dysentery were rampant. The direct link between cholera and water pollution was made in 1854 by a British physician named John Snow, who traced a London cholera outbreak to a local well, which he found was being contaminated by human fecal matter.

Historically, human waste was also carried into rivers here in the United States. In addition, industrial waste and animal waste (such as butchering and leather tanning waste) were also discarded in water supplies. This problem worsened with the acceleration of the industrial revolution, as many factories regarded rivers to be an easy location to store their waste. Eventually, water pollution became so acute that Congress enacted the Clean Water Act in 1972, a law that prohibits the discharge of pollutants into navigable waterways. Currently, the majority of the populations of industrialized countries—such as the United States and European nations—have access to clean water. This is largely due to the wealth of industrialized nations, who are able to allocate the necessary resources and funding to the research and development of clean water sources. Wealthy nations also possess the adequate infrastructure to deposit sewage and other waste in areas where there is little chance of water pollution, ensuring that the water people drink is clean. In contrast, many developing nations do not possess the infrastructure or the means to ensure clean drinking water. Oftentimes, the sewage systems in developing nations deposit human waste straight into the water supplies, thereby contaminating water. The scarcity of existing water sources in these areas intensifies this issue.

NOTES AND NUMBERS:

- 85% of the world's population lives in the driest half of the planet
- 783 million people around the world do not have access to clean water and 2.5 billion lack adequate sanitation
- 6-8 million people die annually as a result of natural disasters and water related diseases
- For every person to live according to current European/American living standards would require 3.5 planet Earths
- Agriculture accounts for ~70% of global freshwater use
- By the 2070s, the number of people affected by the Earth's water shortage will rise from 28mil to 44mil

*Courtesy of the United Nations, 2015

CHILDREN



Every minute a child dies of a water-related disease

WOMEN



Women and children spend 140 million hours a day collecting water

WATER



1 in 9 people lack access to safe water

SANITATION



More people have a mobile phone than a toilet

ECONOMIC



For every \$1 spent on water and sanitation there is a \$4 economic return

—water.org



BLOC POSITIONS

Access to clean water is a global issue, but one that affects regions of the world in various ways. Geographical areas, or geographic blocs, often share conditions, and can be grouped together to understand what sorts of issues each of these territories face.

North America

Most North Americans—more than 90% in fact—have consistent access to clean water. Many non-profit organizations, as well as government programs and legislation, are responsible for the preservation of America's clean waterways.

The Caribbean and Latin America

The people of South America, on average, tend to have 75-90% accessibility to clean water. Data does not exist for certain countries, such as Bolivia, where the privatization of water companies has led to massive inflation and is a serious issue. Bolivia's water industry was privatized between 1997-2001, and is blamed for increasing the nation's poverty levels. Major public protests in Cochabamba turned violent in 2000; water has since been reinstated as a public resource.

Europe

European populations enjoy more than 90% accessibility to clean water. Climate change challenges current water levels, and it is predicted that south and central European regions will, specifically, experience drought in the coming century as a result of changing climatic conditions.

Africa

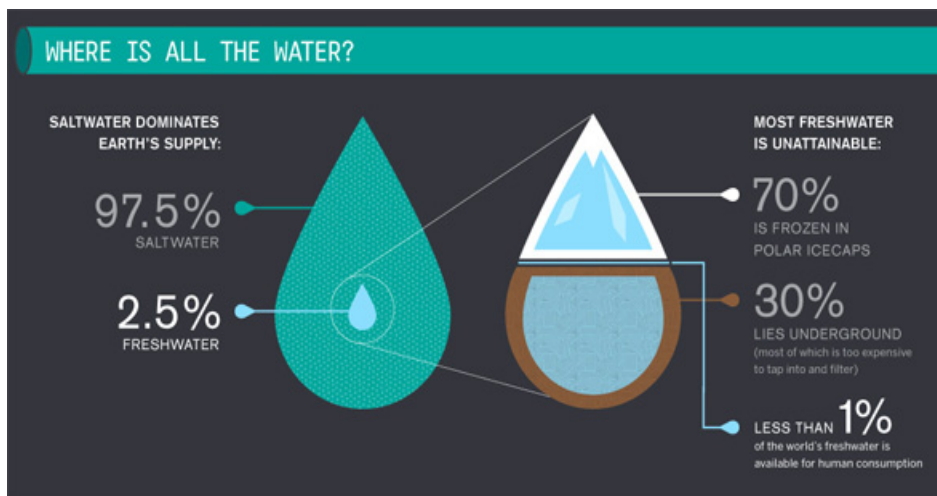
The populations of African nations experience accessibility to clean water ranging from less than 50% all the way up to 90%, in the southern tip of the continent. The DRC, Ethiopia, Madagascar, Mozambique, Niger, and Somalia are among the nations with less than 50% accessibility. Inadequate legislation and enforcement contribute to the pollution of existing waterways, and the lack of filtration before consumption.

The Middle East

Data is not available for all Middle Eastern nations, but accessibility to clean water ranges mostly from 50-80%. This region is curious in that it is located in a desert climate, but certain areas experience extreme wealth, and are able to import disproportionate amounts of water for industry and pleasure.

Asia

Asian nations generally experience upwards of 90% accessibility to clean water, though certain nations, such as Laos and Papua New Guinea average at around 50% accessibility. Asia is one of the most populous regions of the world, and clean water remains an issue for much of the population. The U.N. declared 2005-2015 the "Water for Life" decade in Asia, with the purpose of improving sanitation standards and increasing accessibility. Improvement has been achieved, but billions of people still experience inadequate access to clean water.





LEGISLATION CASE STUDY

Clean Water Act- United States of America, 1972

The U.S. Government began implementing legislation to regulate the usage and pollution of water as early as 1948, but it was not significantly recognized or expanded until 1972. The Environmental Protection Agency is responsible for the execution of the outlined measures.

The Clean Water Act limits the discharge of industrial waste, particularly into "navigable waters", unless allowed by a permit. If water or waste material is discharged, it must first be purified and must stem from a "point source" that is closely monitored. The CWA also monitors cases involving water from a variety of sources, including natural flooding that might cause the overflow of storage facilities, waste from Concentrated Animal Feeding Operations, the discharge of oil, and sources allocated to safe drinking water.

These measures are crucial for the maintenance of effective and safe water distribution throughout the U.S. While the purification of drinking water is a conspicuous industry to control, keeping waterways free of waste is just as important. It is much more expensive to clean industrially polluted waters, and this waste also negatively impacts ecosystems that may be important for agriculture, fishing, or simply in the context of our moral obligation to the environment.

INTERNATIONAL ACTION

Access to clean water may be one of the most important keys to living a life of dignity for everyone in the world. Therefore, in 2000, when the United Nations convened to decide on the Millennium Development Goals, one of the benchmarks of MDG7 (Environmental Sustainability) was to halve the number of people in the world by 2015 living without access to clean water. With the recognition of water as a basic human right, the UN has begun taking action. The UN will use its available means and mechanisms to monitor the progress of nations in realizing the right to water and sanitation and to hold governments accountable. Unfortunately, it is difficult to create one single policy or set of guidelines for all countries to use because each country experiences different levels of development, and therefore faces a unique set of problems.

As the first step in meeting this goal, the clean-water crisis has at last been undoubtedly acknowledged by the international community. Currently, a huge amount of organizations and NGOs exist that are dedicated exclusively to water; examples include **The Water Project**, **Global Water**, and **Charity Water**. The UN, of course, has multiple water-focused programs and departments, such as **UN Water** and **UN Water Decade Programme on Capacity Development** (UNW-DPC).

Most of these organizations strive, as their primary goal, to expand access to clean water to more people, and for that access to be affordable. The Water Project is helping communities dig wells, construct small dams, use tools to catch and gather rain, protect fresh-water springs, filter surface water, and maintain proper sanitation practices.



- Many organizations strive to provide safe drinking water to communities around the world



In fact, water filtration may be the most easily accessible solution for most people worldwide. This can be achieved through harnessing various technologies such as nanotechnology, membrane chemistry (in which water passes through microscopic pores in a membrane to be filtered), seawater desalination (the removal of salt from saltwater, leaving freshwater — this is still not necessarily clean or free of microbes, however), wastewater processing, and more. A recent invention that is particularly interesting is the Life Straw, created by the company Vestergaard. It is a personal water filtration device that lets you drink directly from a ground source of water; it removes 99.999% of waterborne bacteria including E. coli and salmonella, as well as waterborne protozoa; it meets U.S. EPA drinking water standards, and requires no electrical power to be used. Moreover, for every Life Straw purchased online, Vestergaard gives one Life Straw to a student in a developing country.



- Vestergaard's Life Straw filters 99.999% of microbes from any water source

CLEAN WATER SOLUTION	EXPLANATION
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Hand- Dug Wells	Laborers dig up to 15 meters into the Earth (by hand) to reach aquifers below, which are then used as water sources. These wells are low cost, but dangerous, because they are often left uncovered and unsupervised.
Drilled Wells	Mechanical drilling deep into the Earth to reach aquifers, to be used for consumption; a more expensive project than hand-dug wells.
Rainwater Catchments	Gutter systems installed on rooftops direct rainwater into sanitary holding tanks. This type of system may cost between \$7,000- \$10,000 to install.
Gravity Fed Systems	Gravity is used to direct water from an elevated source down into communities. Gravity Fed Systems are expensive to initially install, due to piping costs, and run at around \$10,000. Maintenance costs tend to be low.
Piped Systems	Networks of pipes distribute water to different areas of a community. Installation costs are reasonably expensive, due to cost of piping, up to \$10,000.
Water Purification Systems	Installed treatment systems remove contaminants from existing water systems and make the water usable. These systems range in model, and vary in cost. They can be difficult to transport and install.
BioSand Filters	Layers of sand and microbacterial film filter contaminants. One BioSand system costs about \$90 and produces 60-80 liters of filtered water per day.
Spring Protections	Pure water from natural springs is captured and stored safely. The U.N. estimates these measures to cost around \$1,000.
Latrines	Covered shelters for bathroom use. These allocated structures prevent people from using waterways to dispose of waste, and help keep those systems clean. Costs depend on which materials are used.

- Information courtesy of The Water Project



CASE STUDY: CHOLERA, LONDON

Access to clean water is a crucial factor in the context of global health. Most overtly, water can appear dirty or be visibly contaminated by natural or biological waste, but water can also be host to bacteria and diseases that may be impossible to detect and difficult to control.

Until 1854, disease was thought to be spread only through the air, through a process called "miasma". When London experienced significant cholera outbreaks in the late nineteenth century, a British doctor

began searching for the source of the outbreaks. Dr. John Snow was interested in internal medicine and noticed that patients plagued by cholera experienced symptoms that seemed related to consumption. Over time, he mapped the reported cholera cases and realized that most of them occurred around public wells, particularly one well on Broad Street.

Dr. Snow further investigated this trend and physically examined the water in this well and those connected to it. Using a microscope, he was able to detect the bacteria responsible for the cholera outbreak, which had spread throughout the city via the interconnected waterways. Between the beginning of the cholera outbreaks in 1831, and Dr. Snow's findings in 1854, tens of thousands of people were killed by the illness.

In his research, Dr. Snow cited the disposal of sewage as a principal factor in the outbreak and intensity of the epidemic. Much of the population's waste, at the time, was disposed into poorly maintained septic systems, and the sewage often overflowed into streets— then mixing with water sources— and likely contributing to the start of the outbreak.



- Dr. Snow mapped the number of cases of cholera around the city, and realized most of them were near the Broad Street water pump

In September 1854 Snow took his research to town officials and asked them to close the Broad Street well. After some negotiation it was closed, and the number of cholera cases dropped rapidly. It turned out that Snow had been correct.

Not only did Dr. Snow's work save many lives at the time, but it also changed how seriously water was and still is taken as a resource and as a factor in health. The importance of clean water remains an issue today, and is one that must be addressed around the world.

CONSIDER...

The issues surrounding clean water are just as prevalent today as they were during Dr. Snow's time. Much of the world still lives without consistent access to clean water, which initiates many other problems. How is it that we are still battling to provide this most basic resource?



QUESTIONS:

- How can the global community work together to ensure access to clean water and sanitation for all?
- Global acquisition of clean water for drinking, sanitation and hygiene is an important issue. With an increase in pollution and factory establishments, the availability of clean water depletes. How should this influence development plans for the future?
- Sources of water are often transnational bodies. Who should be responsible for maintaining their health? What about when waste from industrialized nations flows into the water sources in underdeveloped parts of the world?

RESOURCES FOR FURTHER INVESTIGATION

UN Water

<http://www.unwater.org/>

UN Water for Life Decade

<http://www.un.org/waterforlifedecade/asia.shtml>

Clean Water Act

<http://www2.epa.gov/laws-regulations/summary-clean-water-act>

Water.org

<http://water.org>

The Water Project

<http://thewaterproject.org>